REMARKS

Claims 1-14 are pending in the present application. In the above amendments, claims 1, 3, 4, 6, 8, and 10 have been amended, and new claims 11-14 have been added. Therefore, after entry of the above amendments, claims 1-14 will be pending in this application. Applicant believes that the present application is now in condition for allowance, which prompt and favorable action is respectfully requested.

Rejection of Claim 4 Under 35 U.S.C. §112, Second Paragraph

Claim 4 stands rejected under 35 U.S.C. §112, second paragraph as being indefinite because the phrase "said input signal by said programmable digital filter" lacks antecedent basis. Claim 4 has been amended to delete the word "programmable". Antecedent basis for "said digital filter" is provided in claim 1.

Rejection of Claims 1 and 5-10 Under 35 U.S.C. §103(a)

Claims 1 and 5-10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Suominen *et al* (U.S. Patent No. 5,926,513) in view of Kroeger *et al* (U.S. Patent No. 5,404,375). The rejection states that Suominen teaches a receiver with an antenna, a mixer, an analog-to-digital converter (ADC), and a digital filter but fails to teach a baseband processor. The rejection states that Kroeger teaches a baseband processor.

Suominen describes a receiver with analog and digital channel selectivity. A radio frequency (RF) signal from antenna **20** is downconverted from RF to a first IF (45 MHz) by a downconverter **110**, filtered by a bandpass filter (BPF) **120**, and downconverted from the first IF to a second IF (450 kHz) by a mixer **140**. The 450 kHz signal of interest, IF_{450}, is summed with random noise by a summer **240** and then digitized by an ADC **250**. (See FIG. 2 of Suominen.)

Claim 1 of the present invention, as amended, recites:

> "A telecommunications system receiver comprising:
> an antenna for receiving a radio signal having a first frequency;
> a mixer for mixing said radio signal to an intermediate frequency signal;
> a delta-sigma analog-to-digital converter for converting said intermediate frequency signal to a digital intermediate frequency signal having a frequency that is substantially higher than chip rate;

a digital filter for converting said digital intermediate frequency signal to a digital baseband signal, said digital filter performing digital filtering with a programmable filter response; and

a baseband processor for processing said digital baseband signal."

Applicant submits that claim 1 is patentable over Suominen in view of Kroeger for at least the following reasons.

First, Suominen does not describe the use of a delta-sigma analog-to-digital converter, as claim 1 recites. A delta-sigma ADC typically has few bits (e.g., one bit) and can be operated at a much higher frequency than other types of ADC. Suominen describes using a 12-bit ADC sampled at 375 kHz. (See column 5, lines 55-58.)

Second, Suominen does not describe generating "a digital intermediate frequency signal having a frequency that is substantially higher than chip rate". The delta-sigma ADC of claim 1 can be operated at a high frequency, for example, between 60 to 80 MHz. (See page 17, lines 16-17 of the present application.) The frequency of the digital intermediate frequency signal from the delta-sigma ADC can thus be many times greater than the chip rate, which is 1.2288 MHz for many CDMA systems. The use of the delta-sigma ADC at high IF avoids the need for a second frequency downconversion stage (e.g., from 45 MHz to 450kHz), which is highly desirable.

Third, Suominen does not describe "said digital filter performing digital filtering with a programmable filter response". This feature provides control over the filtering characteristics while requiring a minimum of power. (See page 11, lines 13-14 of the present application.)

For at least the above reasons, Applicant submits that claim 1 is patentable over Suominen in view of Kroeger. Claims 5 and 9 are dependent on claim 1 and are patentable for at least the reasons noted for claim 1. These dependent claims may recite additional features not described nor suggested by Suominen and Kroeger.

For claim 6, Suominen does not describe "said digital filter includes means for rejecting jammer signals in said digital intermediate frequency signal." Jammer signals are large amplitude undesired signals that are close in frequency to the desired signals. Jammer signals are especially problematic in cellular systems such as CDMA systems. The rejection states that column 5, lines 31-65 of Suominen teaches this feature of claim 6. However, this section of Suominen actually describes adding a filtered noise signal to the 450 kHz signal of

interest to "randomize the quantization error generated by the ADC 250." (See column 5, lines 31-33.) Applicant submits that adding noise to the signal of interest is not the same as rejecting undesired jammer signals.

For claim 7, Suominen does not describe "said digital filter includes a sample rate converter." As is well known by those skilled in the art, a sample rate converter can convert an input signal having a first frequency to an output signal having a second frequency, where the first frequency may not be an integer multiple of the second frequency. The sample rate converter allows the delta-sigma ADC to be operated over a range of frequencies (e.g., from 60 to 80 MHz). The rejection states that column 6, lines 56-66 of Suominen teaches this feature of claim 7. However, this section of Suominen actually describes a decimating filter that "decimates the input sample rate by a factor of eight". (See column 6, lines 63.) For a decimating filter, the input frequency is an integer multiple of the output frequency. Applicant submits that a decimating filter is not the same as a sample rate converter.

Independent claim 10 has been amended to recite the features noted above for claim 1. Claim 10 should thus be patentable for the reasons noted above for claim 1.

Accordingly, the §103(a) rejection of claims 1 and 5-10 should be withdrawn.

Rejection of Claims 2-4 Under 35 U.S.C. §103(a)

Claims 2-4 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Suominen in view of Kroeger, as applied to claims 1 and 5-10, and further in view of Kaku *et al* (U.S. Patent No. 5,694,422). The rejection states that Suominen and Kroeger teach all subject matter claimed except for the digital filter to include FIR, IIR, and FIR connected in series. The rejection states that Kaku in FIGS. 3, 5, and 7 teaches an arrangement of the FIR, IIR, and FIR to form a digital filter to achieve specific needs of filtering.

Applicant submits that claims 2-4 are patentable over Suominen in view of Kroeger and further in view of Kaku for at least the following reasons. First, the combination of Suominen and Kroeger does not describe all of the elements of base claim 1, as discussed above. The combination of Suominen and Kroeger is thus an insufficient basis for the U.S.C. §103(a) rejection of claims 2-4, which are dependent on claim 1. Second, Kaku shows an arrangement of IIR, IIR, and IIR in FIG. 7, instead of the FIR, IIR, and FIR arrangement recited by the claims. Third, Kaku does not describe the use of programmable coefficients, as the claims recite.

Accordingly, the §103(a) rejection of claims 2-4 should be withdrawn.

New Claims

New claims 11-14 recited additional features of the invention. Claims 11-14 are dependent on claim 1 and are patentable for at least the reasons noted above for claim 1.

CONCLUSION

In light of the amendments contained herein, Applicant submits that the application is in condition for allowance, for which early action is requested.

Please charge any fees or overpayments that may be due with this response to Deposit Account No. 17-0026.

Respectfully submitted,

Dated: 1/20/05

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